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EXAMINER	
EWALD, MARIA VERONICA	

ART UNIT	PAPER NUMBER
1791	

NOTIFICATION DATE	DELIVERY MODE
03/20/2009	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

mailroom@bskb.com

Office Action Summary	Application No.	Applicant(s)	
	10/772,315	YOON ET AL.	
	Examiner	Art Unit	
	MARIA VERONICA D. EWALD	1791	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *26 January 2009*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-15 and 23-26* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-15 and 23-26* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *06 February 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

13. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on January 26, 2009 has been entered.

Double Patenting

14. Applicant is advised that should claim 12 be found allowable, claim 23 will be objected to under 37 CFR 1.75 as being a substantial duplicate thereof. When two claims in an application are duplicates or else are so close in content that they both cover the same thing, despite a slight difference in wording, it is proper after allowing one claim to object to the other as being a substantial duplicate of the allowed claim. See MPEP § 706.03(k). The Examiner is noting that claim(s) 12 and 23 are essentially claiming the same thing, because both claim a molding system with a screw disposed within a cylinder, a heater, a fixed mold, a passage extending through the fixed mold, with a flow accelerating material means provided in the passage, a movable mold, and a same flow accelerating material means provided on the inner walls of both the fixed mold and the movable mold.

Claim Rejections - 35 USC § 103

15. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1 – 3, 5 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bodkins, et al. (U.S. 3,544,518) in view of Ouellette (U.S. 6,852,264). Bodkins, et al. teach an injection mold comprising: a fixed mold having a top surface and a bottom surface spaced from the top surface (item 2' – figure 1); an internal space formed in the top surface (figure 1); a passage extending through the fixed mold (item 4 – figure 1) from the bottom surface to the internal space, the passage having inner walls for injecting a fluid therethrough and into the internal space (column 2, lines 58 – 60); a movable mold detachably attached (item 2 – figure 1) to the fixed mold and forming a molding space together with the internal space of the fixed mold (figure 1); and a flow accelerating material means provided on the inner walls of both the fixed mold and the movable mold that form the molding space for increasing insulation of the fluid and reducing a flow resistance between the inner walls and the fluid so as to accelerate flow of the fluid injected into the injection mold; wherein the same flow accelerating means is a solid coating material (column 2, lines 25 – 35; column 3, lines 45 – 55); wherein the solid coating material is a polymer coating material (column 3, lines 50 – 52); wherein the polymer coating material is one of PTFE, PE and methyacrylate (column 3, lines 50

– 53); and wherein the solid coating material is a ceramic coating material (column 3, lines 58 – 60).

The Examiner is noting and clarifying that Applicant has claimed in claim 1, a flow accelerating material means for increasing insulation of the fluid and reducing a flow resistance between the inner walls and the fluid so as to accelerate flow of the fluid injected into the injection mold. The Examiner is interpreting such a claim limitation as an invocation of 35 U.S.C. 112, 6th paragraph because a flow accelerating material means is claimed without any structure imparted to such a means in claim 1. Thus, per the Specification pages 9 and 13 – 14, the Examiner is interpreting such a means as a solid coating material, lubricant or equivalents thereof, being PTFE, PE, PEEK, ceramics and additional products as listed which serve as a lubricant between the inner wall of the molding space and the molten plastic to reduce a friction therebetween and insulates the molding space, thereby restraining a quick coagulation of the molten plastic (page 13, lines 18 – 22). The Examiner further notes that the dependent claims, which identify a coating material, are not being interpreted as an invocation of 35 U.S.C. 112, 6th paragraph because the identification of a coating material imparts structure to the accelerating means.

Thus, because the primary reference of Bodkins, et al. teach that the insulated mold surface keeps the outer skin of the article from being rapidly cooled and otherwise quenched by the cold mold surface, such that the polymer retains its heat longer (column 2, lines 30 – 35), the Examiner contends that the materials used to insulate the mold of Bodkins, et al. anticipate the flow accelerating material means as claimed

because the materials of Bodkins, et al. equivalently serve to reduce a friction between the plastic and the molding wall, thereby restraining its quick coagulation as described by Applicant.

Bodkins, et al., however, do not specifically teach that the flow accelerating material means is also provided on the inner walls of the mold passage. This, however, is an obvious modification.

For example, Ouellette teach an injection molding apparatus, wherein polymer bars are used to line a runner or manifold leading to a mold cavity (items 116 and 118 – figure 5a). The polymer bars comprised of a material of low thermal conductivity such as PTFE provides sufficient thermal resistance to insure that the plastic molding material or molten resin will not be subject to heating or cooling to a level that will prematurely alter the molding characteristics. For example, in the case of a thermoplastic, the polymer bars serve to prevent initiation of solidification by cooling (column 8, lines 30 – 44). Similarly, the gate leading to the mold itself is comprised of upper and lower spools (items 420 and 422 – figure 9), which are preferably constructed of a material like that of the polymer bars (column 11, lines 45 – 50). The use of a low conductivity material enables the resin material which passes through the nozzle into the cavity to remain at a reasonable uncurable molding temperature due to the heat insulation characteristics of the nozzle (column 11, lines 50 – 55). Thus, Ouellette teaches that the runner and nozzle (i.e., the passages leading into the mold cavity) are preferably comprised of heat insulating materials which serve to prevent any premature solidification of the plastic material, en route to the cavity.

Thus, it would have been obvious to one of ordinary skill in the art at the time of the Applicant's invention to configure the apparatus of Bodkins, et al. such that the mold passage is coated with the same flow accelerating means for the purpose of preventing premature cooling or solidification of the plastic material or allowing the plastic to remain at a reasonable uncurable molding temperature such that it fully flows into the cavity as taught by Ouellette.

Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Bodkins, et al. in view of Ouellette.

Bodkins, et al. and Ouellette teach the characteristics previously described but do not teach that the polymer coating material is PEEK.

However, one of ordinary skill in the art of molding and coatings is well aware that PEEK is an equivalent coating material which exhibits insulative properties and is equivalent to PTFE and the additional polymeric materials listed by both Bodkins, et al. and Ouellette.

Thus, it would have been obvious to one of ordinary skill in the art at the time of the Applicant's invention to configure the apparatus of Bodkins, et al. such that the flow accelerating material means is coated on the mold inner passage, further configured such that the coating is PEEK for the purpose of insulating the mold walls, thereby reducing the friction between the molten plastic and the inner walls, and thus, preventing its premature cooling.

Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Bodkin, et al. in view of Ouellette and further in view of Iwami, et al. (U.S. 5,468,141). Bodkins, et al. and Ouellette teach the characteristics previously described but do not teach that the ceramic coating material is one of aluminum oxide and zirconium oxide.

In injection molding apparatus, Iwami, et al. teach the use of ceramic coatings on inner mold surfaces. The ceramic coatings include titanium oxide, chromium oxide and zirconium oxide (column 8, lines 19 – 25). Such coatings provide good wettability to the plastics being molded while also insulating the mold space. Iwami, et al. teach that the cavity portion of the mold is coated initially with an insulating layer with a low thermal conductivity and secondly with a thin ceramic coating of a metal oxide (i.e., zirconium oxide) which also insulates the molten resin but provides good wettability to the resin, thereby allowing it to flow into any fine or intricate patterns on the mold surface (column 6, lines 1 – 25).

Thus, it would have been obvious to one of ordinary skill in the art at the time of the Applicant's invention to configure the apparatus of Bodkins, et al. such that the same flow accelerating material means is provided on the mold passage as taught by Ouellette, further configured such that the ceramic coating material used as the flow accelerating material means is one of aluminum oxide and zirconium oxide because such materials as known mold coating materials, which provide excellent insulative properties as taught by Iwami, et al.

Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Bodkins, et al. in view of Ouellette.

Bodkins, et al. teach an injection mold comprising: a fixed mold having a top surface and a bottom surface spaced from the top surface (item 2' – figure 1); an internal space formed in the top surface (figure 1); a passage extending through the fixed mold, the passage having an inner wall for introducing a fluid therethrough and into the internal space (item 4 – figure 1); a movable mold detachably attached to the fixed mold and forming a molding space together with the internal space of the fixed mold (item 2 – figure 1); and a flow accelerating means is provided in the molding space for accelerating the flow of the fluid, wherein the flow accelerating means is a solid coating material for increasing the insulation of the fluid and reducing a flow resistance between the inner wall and the fluid so as to accelerate flow of the fluid (column 2, lines 25 – 35; column 3, lines 45 – 60); wherein the solid coating material is a solid lubricant (column 3, lines 53 – 55).

Bodkins, et al., however, fail to teach that the flow accelerating material means is also provided on the inner walls of the mold passage. This, however, is an obvious modification.

For example, Ouellette teach an injection molding apparatus, wherein polymer bars are used to line a runner or manifold leading to a mold cavity (items 116 and 118 – figure 5a). The polymer bars comprised of a material of low thermal conductivity such as PTFE provides sufficient thermal resistance to insure that the plastic molding material or molten resin will not be subject to heating or cooling to a level that will prematurely alter

the molding characteristics. For example, in the case of a thermoplastic, the polymer bars serve to prevent initiation of solidification by cooling (column 8, lines 30 – 44). Similarly, the gate leading to the mold itself is comprised of upper and lower spools (items 420 and 422 – figure 9), which are preferably constructed of a material like that of the polymer bars (column 11, lines 45 – 50). The use of a low conductivity material enables the resin material which passes through the nozzle into the cavity to remain at a reasonable uncurable molding temperature due to the heat insulation characteristics of the nozzle (column 11, lines 50 – 55). Thus, Ouellette teaches that the runner and nozzle (i.e., the passages leading into the mold cavity) are preferably comprised of heat insulating materials which serve to prevent any premature solidification of the plastic material, en route to the cavity.

Thus, it would have been obvious to one of ordinary skill in the art at the time of the Applicant's invention to configure the apparatus of Bodkins, et al. such that the mold passage is coated with the same flow accelerating means for the purpose of preventing premature cooling or solidification of the plastic material or allowing the plastic to remain at a reasonable uncurable molding temperature such that it fully flows into the cavity as taught by Ouellette.

The Examiner is noting that Applicant has claimed a flow accelerating material means; however, because Applicant has identified the means as a solid lubricant, the Examiner is not interpreting such means as an invocation of 35 U.S.C. 112, 6th paragraph.

Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Bodkins, et al. in view of Ouellette and further in view of Imamura, et al. (U.S. 5,656,104). Bodkins, et al. and Ouellette teach the characteristics previously described but do not specifically teach that the lubricant is one of disulfide, molybdenum and graphite.

However, such materials are known mold lubricants which can withstand high temperatures. For example, Imamura, et al. teach coating a mold surface with a solid lubricant film, which may be comprised of molybdenum disulfide, graphite, boron nitride and equivalent compounds (column 16, lines 25 – 30). Such materials are chemically stable and serve to withstand high temperatures, while insulating the mold surface (column 16, lines 30 – 60).

Thus, it would have been obvious to one of ordinary skill in the art at the time of the Applicant's invention to configure the apparatus of Bodkins, et al. with the flow accelerating material means provided on the mold passage as taught by Ouellette, such that the flow accelerating material means is a solid lubricant, selected from the group molybdenum, graphite and disulfide because such materials are known mold lubricants as taught by Imamura, et al.

Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Bodkins, et al. in view of Ouellette and further in view of Yotsutsuji, et al. (U.S. 4,225,109). Bodkins, et al. teach an injection mold comprising: a fixed mold having a top surface and a bottom surface spaced from the top surface (item 2' – figure 1); an internal space formed in the top surface (figure 1); a passage extending through the fixed mold, the

passage having an inner wall for introducing a fluid therethrough and into the internal space (item 4 – figure 1); a movable mold detachably attached to the fixed mold and forming a molding space together with the internal space of the fixed mold (item 2 – figure 1); and a flow accelerating means is provided in the molding space for accelerating the flow of the fluid, wherein the flow accelerating means is a solid coating material for increasing the insulation of the fluid and reducing a flow resistance between the inner wall and the fluid so as to accelerate flow of the fluid (column 2, lines 25 – 35; column 3, lines 45 – 60).

Bodkins, et al., however, fail to teach that the flow accelerating material means is also provided on the inner walls of the mold passage. This, however, is an obvious modification.

For example, Ouellette teach an injection molding apparatus, wherein polymer bars are used to line a runner or manifold leading to a mold cavity (items 116 and 118 – figure 5a). The polymer bars comprised of a material of low thermal conductivity such as PTFE provides sufficient thermal resistance to insure that the plastic molding material or molten resin will not be subject to heating or cooling to a level that will prematurely alter the molding characteristics. For example, in the case of a thermoplastic, the polymer bars serve to prevent initiation of solidification by cooling (column 8, lines 30 – 44). Similarly, the gate leading to the mold itself is comprised of upper and lower spools (items 420 and 422 – figure 9), which are preferably constructed of a material like that of the polymer bars (column 11, lines 45 – 50). The use of a low conductivity material enables the resin material which passes through the nozzle into the cavity to remain at

a reasonable uncurable molding temperature due to the heat insulation characteristics of the nozzle (column 11, lines 50 – 55). Thus, Ouellette teaches that the runner and nozzle (i.e., the passages leading into the mold cavity) are preferably comprised of heat insulating materials which serve to prevent any premature solidification of the plastic material, en route to the cavity.

Bodkins, et al. and Ouellette, also do not teach that the flow accelerating means is a solid coating metal material. This, however, is also an obvious modification.

For example, Yotsutsuji, et al. teach an injection mold, wherein the mold surface is coated with a thin metal layer and a heat-insulating layer. The two layers together, serve to allow the resin injected into the mold to cool at a regulated speed, such that premature cooling of the resin is inhibited to the greatest extent possible (column 2, lines 50 – 55). The metal and heat insulating layer, thus minimizes the formation of weld marks or flow marks, thereby producing a uniform plastic product with reduced residual stress (column 2, lines 60 – 65).

Thus, it would have been obvious to one of ordinary skill in the art at the time of the Applicant's invention to configure the apparatus of Bodkins, et al. with the flow accelerating material means provided on the mold passage as taught by Ouellette, further modified such that the flow accelerating material means is a solid metal material for the purposes of inhibiting premature cooling or solidification of the plastic material or allowing the plastic to remain at a reasonable uncurable molding temperature such that it fully flows into the cavity as taught by Ouellette and Yotsutsuji, et al.

The Examiner is noting that Applicant has claimed a flow accelerating material means; however, because Applicant has identified the means as a solid metal, the Examiner is not interpreting such means as an invocation of 35 U.S.C. 112, 6th paragraph.

Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Bodkins, et al. in view of Ouellette, in view of Yotsutsuji, et al. and further in view of Yang (U.S. 4,390,485). Bodkins, et al., Ouellette and Yotsutsuji, et al. teach the characteristics previously described but do not teach that the solid metal is one of lead, indium, cadmium, tin and silver.

These metals, however, are known insulators and their use would be an obvious modification.

For example, Yang teach an insulated metal mold, which is comprised of a thin metal sheet on its inner surface. Typical prior art molds, as taught by Yang were coated with silver (column 1, lines 58 – 60).

Thus, it would have been obvious to one of ordinary skill in the art at the time of the Applicant's invention to configure the apparatus of Bodkins, et al. with the with the flow accelerating material means provided on the mold passage as taught by Ouellette, further modified such that the flow accelerating material means is a solid metal material wherein the metal is silver for the purposes of inhibiting premature cooling or solidification of the plastic material or allowing the plastic to remain at a reasonable uncurable molding temperature such that it fully flows into the cavity.

Claims 12 – 15 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bodkins, et al. in view of Ouellette. Bodkins, et al. teach a molding system comprising: a cylinder having an inlet and an outlet; a screw installed inside the cylinder and making a mold material and a mixture including a plastic introduced into the inlet of the cylinder flow toward the outlet; a heater for heating the mold material and mixture introduced in the cylinder (column 4, lines 20 – 40); a fixed mold having a top surface and a bottom surface spaced from the top surface (item 2' – figure 1); an internal space formed in the top surface (figure 1); a passage extending through the fixed mold, the passage having an inner wall for injecting a fluid therethrough and into the internal space (item 4 – figure 1); a movable mold detachably attached to the fixed mold and forming a molding space together with the internal space of the fixed mold (item 2 – figure 1); and a flow accelerating material means provided on the inner walls of both the fixed mold and the movable mold that form the molding space for increasing insulation of the fluid and reducing a flow resistance between the inner walls and the fluid so as to accelerate flow of the fluid injected into the injection mold; wherein the same flow accelerating means is a solid coating material (column 2, lines 25 – 35; column 3, lines 45 – 55);); wherein the polymer coating material is one of PTFE, PE and methyacrylate (column 3, lines 50 – 53); and wherein the solid coating material is a ceramic coating material (column 3, lines 58 – 60); wherein a foaming agent supplier is provided at the side of the inlet of the cylinder to supply a foaming agent into the

cylinder; and wherein a gas supplier is provided at the side of the inlet of the cylinder to supply a gas into the cylinder (column 4, lines 25 – 35).

The Examiner is noting and clarifying that Applicant has claimed in claim 12, a flow accelerating material means for increasing insulation of the fluid and reducing a flow resistance between the inner walls and the fluid so as to accelerate flow of the fluid injected into the injection mold. The Examiner is interpreting such a claim limitation as an invocation of 35 U.S.C. 112, 6th paragraph because a flow accelerating material means is claimed without any structure imparted to such a means in claim 12. Thus, per the Specification pages 9 and 13 – 14, the Examiner is interpreting such a means as a solid coating material, lubricant or equivalents thereof, being PTFE, PE, PEEK, ceramics and additional products as listed which serve as a insulator or lubricant between the inner wall of the molding space and the molten plastic to reduce a friction therebetween and insulates the molding space, thereby restraining a quick coagulation of the molten plastic (page 13, lines 18 – 22). The Examiner further notes that the dependent claims, which identify a coating material, are not being interpreted as an invocation of 35 U.S.C. 112, 6th paragraph because the identification of a coating material imparts structure to the accelerating means.

Thus, because the primary reference of Bodkins, et al. teach that the insulated mold surface keeps the outer skin of the article from being rapidly cooled and otherwise quenched by the cold mold surface, such that the polymer retains its heat longer (column 2, lines 30 – 35), the Examiner contends that the materials used to insulate the mold of Bodkins, et al. anticipate the flow accelerating material means as claimed

because the materials of Bodkins, et al. equivalently serve to reduce a friction between the plastic and the molding wall, thereby restraining its quick coagulation as described by Applicant.

Bodkins, et al., however, do not specifically teach that the flow accelerating material means is also provided on the inner walls of the mold passage. This, however, is an obvious modification.

For example, Ouellette teach an injection molding apparatus, wherein polymer bars are used to line a runner or manifold leading to a mold cavity (items 116 and 118 – figure 5a). The polymer bars comprised of a material of low thermal conductivity such as PTFE provides sufficient thermal resistance to insure that the plastic molding material or molten resin will not be subject to heating or cooling to a level that will prematurely alter the molding characteristics. For example, in the case of a thermoplastic, the polymer bars serve to prevent initiation of solidification by cooling (column 8, lines 30 – 44). Similarly, the gate leading to the mold itself is comprised of upper and lower spools (items 420 and 422 – figure 9), which are preferably constructed of a material like that of the polymer bars (column 11, lines 45 – 50). The use of a low conductivity material enables the resin material which passes through the nozzle into the cavity to remain at a reasonable uncurable molding temperature due to the heat insulation characteristics of the nozzle (column 11, lines 50 – 55). Thus, Ouellette teaches that the runner and nozzle (i.e., the passages leading into the mold cavity) are preferably comprised of heat insulating materials which serve to prevent any premature solidification of the plastic material, en route to the cavity.

Thus, it would have been obvious to one of ordinary skill in the art at the time of the Applicant's invention to configure the apparatus of Bodkins, et al. such that the mold passage is coated with the same flow accelerating means for the purpose of preventing premature cooling or solidification of the plastic material or allowing the plastic to remain at a reasonable uncurable molding temperature such that it fully flows into the cavity as taught by Ouellette.

Claim 23 is rejected under 35 U.S.C. 103(a) as being unpatentable over Bodkins, et al. in view of Ouellette. Bodkins, et al. teach a molding system comprising: a cylinder having an inlet and an outlet; a screw installed inside the cylinder and making a mold material and a mixture including a plastic introduced into the inlet of the cylinder flow toward the outlet; a heater for heating the mold material and mixture introduced in the cylinder (column 4, lines 20 – 40); a fixed mold having a top surface and a bottom surface spaced from the top surface (item 2' – figure 1); an internal space formed in the top surface (figure 1); a passage extending through the fixed mold, the passage having an inner wall for injecting a fluid therethrough and into the internal space (item 4 – figure 1); a movable mold detachably attached to the fixed mold and forming a molding space together with the internal space of the fixed mold (item 2 – figure 1); and a flow accelerating material means provided on the inner walls of both the fixed mold and the movable mold that form the molding space for increasing insulation of the fluid and reducing a flow resistance between the inner walls and the fluid so as to accelerate flow of the fluid injected into the injection mold.

The Examiner is noting and clarifying that Applicant has claimed in claim 23, a flow accelerating material means for increasing insulation of the fluid and reducing a flow resistance between the inner walls and the fluid so as to accelerate flow of the fluid injected into the injection mold. The Examiner is interpreting such a claim limitation as an invocation of 35 U.S.C. 112, 6th paragraph because a flow accelerating material means is claimed without any structure imparted to such a means in claim 23. Thus, per the Specification pages 9 and 13 – 14, the Examiner is interpreting such a means as a solid coating material, lubricant or equivalents thereof, being PTFE, PE, PEEK, ceramics and additional products as listed which serve as a insulator or lubricant between the inner wall of the molding space and the molten plastic to reduce a friction therebetween and insulates the molding space, thereby restraining a quick coagulation of the molten plastic (page 13, lines 18 – 22). The Examiner further notes that the dependent claims, which identify a coating material, are not being interpreted as an invocation of 35 U.S.C. 112, 6th paragraph because the identification of a coating material imparts structure to the accelerating means.

Thus, because the primary reference of Bodkins, et al. teach that the insulated mold surface keeps the outer skin of the article from being rapidly cooled and otherwise quenched by the cold mold surface, such that the polymer retains its heat longer (column 2, lines 30 – 35), the Examiner contends that the materials used to insulate the mold of Bodkins, et al. anticipate the flow accelerating material means as claimed because the materials of Bodkins, et al. equivalently serve to reduce a friction between

the plastic and the molding wall, thereby restraining its quick coagulation as described by Applicant.

Bodkins, et al., however, do not specifically teach that the flow accelerating material means is also provided on the inner walls of the mold passage. This, however, is an obvious modification.

For example, Ouellette teach an injection molding apparatus, wherein polymer bars are used to line a runner or manifold leading to a mold cavity (items 116 and 118 – figure 5a). The polymer bars comprised of a material of low thermal conductivity such as PTFE provides sufficient thermal resistance to insure that the plastic molding material or molten resin will not be subject to heating or cooling to a level that will prematurely alter the molding characteristics. For example, in the case of a thermoplastic, the polymer bars serve to prevent initiation of solidification by cooling (column 8, lines 30 – 44). Similarly, the gate leading to the mold itself is comprised of upper and lower spools (items 420 and 422 – figure 9), which are preferably constructed of a material like that of the polymer bars (column 11, lines 45 – 50). The use of a low conductivity material enables the resin material which passes through the nozzle into the cavity to remain at a reasonable uncurable molding temperature due to the heat insulation characteristics of the nozzle (column 11, lines 50 – 55). Thus, Ouellette teaches that the runner and nozzle (i.e., the passages leading into the mold cavity) are preferably comprised of heat insulating materials which serve to prevent any premature solidification of the plastic material, en route to the cavity.

Thus, it would have been obvious to one of ordinary skill in the art at the time of the Applicant's invention to configure the apparatus of Bodkins, et al. such that the mold passage is coated with the same flow accelerating means for the purpose of preventing premature cooling or solidification of the plastic material or allowing the plastic to remain at a reasonable uncurable molding temperature such that it fully flows into the cavity as taught by Ouellette.

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Claim 25 is rejected under 35 U.S.C. 103(a) as being unpatentable over Bodkins, et al. in view of Ouellette and further in view of Iwami, et al. Bodkins, et al. and Ouellette teach the characteristics previously described but do not teach that the solid coating material is one of zirconium oxide.

In injection molding apparatus, Iwami, et al. teach the use of ceramic coatings on inner mold surfaces. The ceramic coatings include titanium oxide, chromium oxide and zirconium oxide (column 8, lines 19 – 25). Such coatings provide good wettability to the plastics being molded while also insulating the mold space. Iwami, et al. teach that the cavity portion of the mold is coated initially with an insulating layer with a low thermal conductivity and secondly with a thin ceramic coating of a metal oxide (i.e., zirconium oxide) which also insulates the molten resin but provides good wettability to the resin, thereby allowing it to flow into any fine or intricate patterns on the mold surface (column 6, lines 1 – 25).

Thus, it would have been obvious to one of ordinary skill in the art at the time of the Applicant's invention to configure the apparatus of Bodkins, et al. such that the

same flow accelerating material means is provided on the mold passage as taught by Ouellette, further configured such that the solid coating material used as the flow accelerating material means is zirconium oxide because such materials as known mold coating materials, which provide excellent insulative properties as taught by Iwami, et al.

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Response to Arguments

16. Applicant's arguments with respect to claims 1, 8, 12 and 23 and their dependent claims have been considered but are moot in view of the new ground(s) of rejection. Applicant primarily argues that the previously-cited references of Bodkins, et al., Yotsutsuji, et al., Hendry and Kataoka do not teach mold passages with a flow accelerating material means. Applicant then argues that the secondary references of Ouellette and Wright fail to remedy this deficiency in each of the primary references.

The Examiner disagrees with both points because the Examiner maintains that each of the previously-cited references teaches an insulating means or coating on the mold walls which behave as the flow accelerating material means of Applicant, wherein the means prevents premature coagulation of the fluent resin. However, based upon a review of the references and an updated search, the Examiner applies the primary reference of Bodkins, et al. which succinctly details the coating on the mold walls and how the coating serves to prevent the injected plastic from cooling prematurely.

The Examiner also cites the secondary reference of Ouellette which not only teaches polymer bars to line the runner, but also teaches that the mold gate and thus, the mold passage may also be configured with the same polymer bars as the runner to

enable the molding material to remain at a reasonable uncured molding temperature within the nozzle flow-through passageway (column 11, lines 45 – 52).

The Examiner maintains that each of the above-cited references in the combinations presented serve to render obvious the claims. Most importantly, the materials identified as an insulator, coating or lubricant are equivalents of the flow accelerating material means of Applicant because each serves to restrain a quick coagulation of the molten plastic (Applicant's specification, page 13, lines 18 – 22).

Conclusion

17. Any inquiry concerning this communication or earlier communications from the examiner should be directed to MARIA VERONICA D. EWALD whose telephone number is (571)272-8519. The examiner can normally be reached on M-F, 8 - 4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Dr. Yogendra Gupta can be reached on 571-272-1316. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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MVE

/Maria Veronica D Ewald/
Examiner, Art Unit 1791